Introduction: Procedural Meaning

Non-Truth-Conditional Expressions and Semantic Constraints on Implicatures

In the 1970s a debate was open among the philosophers of language with respect to the limits of a theory of meaning and the borderline between semantics and pragmatics. One of the most pervasive challenges that a truth-conditional semantic theory had to face was the existence of linguistic items that did not seem to play any role in the determination of propositional content: discourse connectives represented a major case in point. There was indeed a general agreement about the fact that linguistic items such as *therefore*, *so* and *after all* do not belong to semantics, since they do not contribute to the truth-conditions of the proposition expressed by the utterances in which they occur; their contribution was rather treated as a matter of pragmatics, either as a presupposition (Karttunen, 1974; Stalnaker, 1974; Karttunen and Peters, 1979) or as a conventional implicature (Grice, 1975): for instance, when *therefore* links two propositions, it pragmatically presupposes, or conventionally implicates, that the one it introduces is a consequence of the former.

The development of Relevance Theory (Sperber and Wilson, 1986/1995) as a model for human communication paved the way for a new understanding of the relationship between semantics and pragmatics and the distribution of labour between coding/decoding and ostension/inference in the interpretation of utterances. The issue of non-truth-conditional linguistic expressions was soon addressed in this framework in Blakemore (1987). The major claim in Blakemore's book is that semantics does not squarely correspond to truth-conditional content; rather semantics is to be defined as dealing with quite a specific form of knowledge, namely linguistic knowledge, whilst pragmatics, in contrast, involves more general, non-linguistic, psychological principles

and processes. As a consequence, linguistic meaning is not confined to determining truth-conditions, but it also plays a role in some non-truth-conditional aspects of utterance interpretation. Blakemore convincingly showed that discourse connectives are better understood as placing constraints on the inferential phase of interpretation by providing instructions to the hearer as to how the proposition is to be processed for relevance, that is, by guiding him to the appropriate choice of contextual assumptions he must supply to obtain the intended interpretation. Discourse connectives can feed the system of inferential rules: some of them introduce premises (*after all*, *moreover*) and conclusions (*therefore*), which are used to strengthen contextual assumptions; others, such as *so*, can point to implications; finally, other particles encode instructions for the hearer to abandon existing assumptions, as is the case with connectives of denial and contrast, such as *but*, *however* and *nevertheless* (Blakemore, 1987, 1988, 1992, 1997). In this light, discourse markers contribute to utterance interpretation by establishing inferential relations between propositions in discourse. They do not contribute to the proposition expressed, but nevertheless are part of semantics, since their meaning is a matter of specific linguistic knowledge.

This approach has major implications for the general design of the theory. A proper understanding of the relationship between linguistic form and utterance interpretation requires, Blakemore concludes, that the theory of linguistic meaning be split into a theory of logical forms (abstract schemata, blueprints for propositions) and a theory of semantic constraints on pragmatic inference. She advocates for a non-unitary theory of linguistic semantics:

> On the one hand, there is the essentially *conceptual* theory that deals with the way in which elements of linguistic structure map onto concepts – that is, onto constituents of propositional representations that undergo computations. On the other, there is the essentially *procedural* theory that deals with the way in which elements of linguistic structure map directly onto computations themselves – that is onto mental processes. (Blakemore, 1987: 144)

The conceptual/procedural distinction was first meant as a solution to a particular problem in the semantic/pragmatic divide and it has remained ever since one of the core ideas in the way Relevance Theory envisages the contribution of linguistic meaning to utterance interpretation. The existence of linguistic items imposing linguistically encoded constraints on the context in which an utterance has to be interpreted is precisely what a theory of human communication such as Relevance Theory predicts: a speaker is expected not to put her

addressee to unnecessary effort to obtain a relevant interpretation for her utterance, so she should aim at reducing the hearer's processing effort in the identification of a maximally efficient set of background assumptions by overtly guiding him in this process.

Procedural meanings, then, are encoded instructions that specify computational operations to be performed during interpretation and, more precisely, to access a particular context for interpretation. Linguistic items with procedural meaning contain computational information that requires a propositional representation to which they should apply, without being themselves constituents of the proposition they are attached to.

The idea that some linguistic items encode processing instructions was initially applied to the analysis of discourse connectives, as mentioned before, but from the very beginning the procedural approach was also found useful to account for particles interacting with focus, such as *also*, *too* and *either* (Blakemore, 1987, 1992). And, though she does not work them out in detail, Blakemore explicitly refers to some syntactic structures, such as cleft constructions, and to prosodic patterns as suitable candidates for an analysis in procedural terms. Intonation, for example, interacts with both conceptual items and procedural particles to constrain the interpretation. Procedural meaning thus offered a solution for some issues that were previously found to be problematic for the semantics of natural language.

Refining the Notion of Procedural Meaning: Semantic Constraints on Inference

Subsequent work on procedural meaning within the relevance-theoretic framework both deepened the notion of *procedural meaning* itself in the overall picture of communication and widened the range of phenomena that can be dealt with in procedural terms.

The major refinement of the notion of procedural meaning is found in Wilson and Sperber (1993). They assume the conceptual/ procedural distinction to be based on general, cognitive grounds:

> Linguistic decoding provides input to the inferential phase of comprehension; inferential comprehension involves the construction and manipulation of conceptual representations. An utterance can thus be expected to encode two basic types of information: representational and computational, or conceptual and procedural – that is, information about the representations to be manipulated,

and information about how to manipulate them. (Wilson and Sperber, 1993: 2)

They also mention a defining property of procedural expressions. Whilst conceptual representations can be brought to consciousness, procedures cannot:

> We have direct access neither to grammatical computations nor to the inferential computations used in comprehension. A procedural analysis of discourse particles would explain our lack of direct access to the information they encode. (Wilson and Sperber, 1993: 16)

This explains, for instance, the difficulties that learners of a foreign language experience when dealing with procedural expressions, which are harder to learn than conceptual expressions. In fact, in research from the field of second language acquisition, a separate divide among classes of mental processes associated with knowledge and memory of linguistic items has also established the label *procedural*, in this case, in contrast to declarative knowledge and based upon empirical neurolinguistic evidence (Paradis, 2009). It has been suggested in fact that procedural knowledge, similarly to relevance-theoretical procedural meaning, sustains computational skills or procedures and consists of implicit understanding that constitutes a discrete knowledge category, contrasting with that of declarative knowledge (Gundel, 2011). Hence, a new direction for further development of the notion of procedural meaning which remains as of yet unexplored would be to analyse its relationship with the mental processes associated with the type of knowledge and memory that neurolinguistic studies have classified as procedural.

Returning to Wilson and Sperber, they contend the main assumption in the original approach, namely that encoding instructions and non-truth-conditional status mutually imply each other. Wilson and Sperber (1993) argue against this view and postulate a necessary dissociation between these two properties. The dissociation goes both ways. On the one hand, there can be linguistic expressions that are conceptual but non-truth-conditional. This is the case of so-called illocutionary adverbials, such as *seriously* and *frankly*: though they encode regular concepts, these are not part of the *propositional* or *basic-level explicature* (the primary proposition expressed by the utterance), but rather a part of *higher-level explicatures*, a set of conceptual representations where the basic proposition has been embedded under descriptions concerning propositional attitude and illocutionary force. On the other hand, there are also linguistic items that encode procedures and, at the same time, contribute to the truth-conditions of the proposition in which they occur. Personal pronouns, such as *I* and

you, represent a case in point. In this respect, Wilson and Sperber follow the proposal in Kaplan (1989), who showed that accounting for the contribution of *I* as encoding a concept like 'the speaker' would yield inadequate results; in contrast, if conceived of as encoding the instruction to identify its referent by first identifying the speaker, the right predictions will obtain. Kaplan then suggests a distinction between the *content* of an expression (i.e. the individual referred to in each occurrence of the first person pronoun) and its *character* (i.e. the rule for identifying the intended referent). Characters are rules that ''determine the content (the propositional constituent) for a particular occurrence of an indexical. But they are not a part of the content (they constitute no part of the propositional constituent)'' (Kaplan, 1989: 523). Thus, personal pronouns illustrate the case of linguistic expressions that are both procedural and truth-conditional. As procedural expressions, they encode constraints on the inferential phase of interpretation, very much like discourse connectives; but whereas discourse connectives impose constraints on the implicatures (by restricting the search space for an adequate context of interpretation), pronouns ''impose constraints on explicatures: they guide the search for the intended referent, which is part of the proposition expressed.'' (Wilson and Sperber, 1993: 21)

Once it has been shown that semantic constraints on inference do not only operate on implicatures, but can also contribute to determining the propositional content of an utterance, the way is paved for considering a further class of procedural expressions: those imposing constraints on the identification of propositional attitude and speech-act class. Mood indicators (the markers that distinguish, for instance, a declarative from an interrogative) can be analysed this way: they do not encode a conceptual representation of a particular illocutionary force, but rather they express constraints on the inferential construction of it.

The notion of procedural meaning thus turned out to be more complex than had been assumed in earlier views. This added complexity has, however, some advantages: the number of phenomena that can be encompassed under this label is now larger than before and, at the same time, the generalisations that are obtained are more significant and contribute both to a better understanding of linguistic facts and to a more economic development of the theory.

Varieties of Procedural Meaning

A wealth of works has examined various linguistic phenomena from the perspective that has developed out of the conceptual/procedural

distinction. The topic of discourse markers was the first, and probably the favourite one, found in the literature on procedural meaning. The works by Blakemore (1988, 1998, 2000, 2002, 2007), Blass (1988, 1989 1990), Rouchota (1998), Iten (1998), Ifantidou (2000), Fretheim (2000), Moeschler (2002), Curcó (2004), Hall (2004, 2007), Pons (2008), Olmos and Ahern (2009) and Olmos (2010) can serve as an example of the interest that researchers have shown in accounting for the contribution of procedural expressions such as *but*, *so* or *although*.

Mood and modality soon proved to be an area to which an approach in procedural terms could give interesting explanatory results. Wilson and Sperber (1988) set the foundations for a procedural account of the whole range of linguistic devices that contribute to determining illocutionary force and propositional attitude. Other works followed, such as Clark (1991, 1993), Rouchota (1994), Ifantidou (2001), Ahern (2004, 2005, 2006, 2010), Ahern and Leonetti (2004), Iten (2005) and Jary (2004, 2009, 2010), among many more.

Our understanding of reference, both in the nominal and in the verbal domain, has greatly benefited from the approaches in procedural terms. The connection between time and verbal tense, and the way in which these notions can be related, has been explored in Žegarac (1990), Wilson and Sperber (1998), Moeschler (1993), Moeschler (dir) (1998), Sthioul (1998), Saussure and Sthioul (1999), Rocci (2000), Moeschler and Recichler-Béguelin (eds.) (2000), Saussure (2003, 2010), Leonetti and Escandell-Vidal (2003), Saussure, Moeschler and Puskas (eds.) (2007) and Amenós-Pons (2010a, b). The contribution of pronouns and determiners to the identification of the intended representation of an entity has been considered in depth in Gundel (1996, 2010), Gundel et al. (1993), Gundel and Mulkern (1997), Gundel, Borthen and Fretheim (1999), Fretheim (1997), Breheny (1999), Leonetti (2000, 2004), Hedley (2005, 2007), Klinge (2006) and Scott (2008).

Intonation has also been a privileged area in the literature on procedural encoding. In fact, the notion of procedural meaning facilitated the treatment of many aspects of the contribution of prosody to utterance interpretation within a unified framework, which made it possible to identify and recognise the linguistic status of certain prosodic cues that lacked any previous systematic description. Among the works dealing with these issues, the following can be mentioned: House (1989, 1990, 2006), Clark and Lindsey (1990), Escandell-Vidal (1996, 1998, 2002), Fretheim (1998, 2002), Imai (1998), Wilson and Wharton (2006), Labastía (2006) and Clark (2007).

Controversial Issues

The explanatory potential of the notion of procedural meaning has been clearly shown in the works mentioned above. However, neither the notion itself nor the way it has been differentiated from conceptual meaning, have been free from controversy. A number of scholars have questioned some of the basic assumptions underlying them.

One of the major points in the relevance-theoretic approach was that procedural constraints are part of linguistic knowledge, and hence, procedural meaning is a kind of encoded, semantic meaning. This assumption has been contested by Bezuidenhout (2004). She claims that, being constraints on processing and interpretation, procedural units must belong to a theory of language use, that is of language performance, not of language competence. In her view, the very notion of *procedural semantics* is a contradiction in terms, since considering procedural knowledge as semantic would turn it into something with conceptual content, thus losing its procedural nature. If procedural meaning is conceived of as a set of production rules, new rules will be needed to account for the symbols contained in them, which in turn will require more rules, thus inducing an infinite regress. To avoid these short-comings, instead of seeing procedural instructions as rules expressing constraints on inference, as Blakemore (1987) and Wilson and Sperber (1993) do, Bezuidenhout treats them in terms of causal dispositions. The conceptual/procedural distinction can be maintained, she states, as long as we envisage it as a distinction of ways in which knowledge is embodied: in concepts, it takes the form of mental representations stored in the lexicon; in procedures, in contrast, it is part of the causal architecture of the performance system (see Wilson, this volume, Ch. 1, and particularly see Curcó, this volume, Ch. 2 for a discussion of this point).

The classical view on procedural meaning assumes that there is a neat, clear-cut division between what is conceptual and what is procedural. This division can be envisaged in at least two different ways. On the one hand, it can be conceived of as a distinction about linguistic expressions, hence parallel to that of lexical and grammatical categories. Lexical categories (nouns, verbs, adjectives bearing descriptive content, *-ly* adverbs) contribute to utterance interpretation by encoding concepts, whereas grammatical, or functional, categories encode various kinds of constraints on inferential processes (Escandell-Vidal and Leonetti 2000, 2004). On the other hand, the distinction can be argued to involve kinds of linguistic meaning, or the kinds of information that a linguistic expression can encode, namely conceptual and

procedural, without any particular commitment to a general classification of linguistic expressions.

Different objections have been made to these views. Starting from the assumption that both conceptual and procedural information are represented in the language of thought as the result of a linguistic process of decoding, Nicolle (1996, 1997) suggested that a single expression can encode both descriptive and procedural meaning. This could be the case of third person pronouns (*he*, *she*), which encode the instruction to identify an accessible referent but should also include some conceptual content, such as male/female and animate. The accessibility requirement is common to the whole class of (third person) pronouns, whilst the conceptual information varies from pronoun to pronoun. What this example shows is that the members of grammatical classes can contain some kind of conceptual information together with the procedural instruction. More recently, however, Hedley (2005) has argued that such features as 'male' in the pronoun *he* are "interpretive aids, or instructions to the hearer as to the best way to resolve the reference of the pronoun – that is they look distinctly procedural." In a similar vein, Fraser (2006) has argued that discourse markers, some illocutionary adverbials and pronouns, in addition to procedural meaning, must also have a conceptual component. He defends the view that

> ... every linguistic form potentially contains three types of semantic information: procedural, which specifies the role it plays in the interpretative structure of the sentence; conceptual, which specifies its representational content; and combinatorial, which specifies with what constituents and in what way it may combine to produce more complex semantic structures.

Several of the chapters in this volume, namely the ones by Wilson, Curcó, Saussure, Fretheim, and Escandell-Vidal and Leonetti, include remarks about how procedural and conceptual features are combined in the meaning of lexical items.

A further critical stance has been developed around the idea that, after all, no matter their status, all linguistic expressions encode instructions for building interpretations, thus blurring the conceptual/ procedural distinction in favour of a massively procedural approach. Espinal (1996a, b) defends the hypothesis that lexical entries are just instructions for building interpretations at different interface levels:

> A language is basically a set of procedures encoded in a lexicon. The lexicon no longer stipulates interpretations for lexical items; rather it stipulates instructions for content building, and therefore

> for sentence meaning and utterance interpretation. (Espinal, 1996b: 109)

More specifically, her point is that all lexical items are to be conceived as sets of instructions operating at various levels of representation:

> ... some of them may provide conceptual information, others provide logical information (e.g. logical type category, that is, LF-selection specifications, and logical constraints on the connection of premises, illustrated below), and still others provide syntactic information (e.g. restrictions on the scope effects that certain adjuncts always have over other adjuncts; for example, modal adverbs and certain temporal adverbs and temporal quantifiers with regard to the negative operator). (Espinal, 1996a: 35)

The concept encoded in a lexical item would contain an instruction to build a conceptual representation suitable and relevant to the interpretation (see Wilson, this volume, Ch. 1 for a proposal along similar lines). Thus, the strategy initially used to account for the linguistic constraints on implicatures has been progressively extended to other aspects of the inferential development of the propositional form, including representational content itself.

From quite a different perspective, another area that is open to debate is the question of the degree to which neat parcelling of procedural meaning as a discrete category is appropriate or even possible, addressed in works such as Wharton (2009). This author notes that linguistic features such as intonation include both aspects that are arbitrary and properly linguistic, and aspects governed by 'biological codes' conveying 'universal paralinguistic meanings', as Gussenhoven (2002: 47) pointed out. Furthermore, Wharton (2009) shows that paralinguistic items such as interjections, in certain circumstances – for example when used not in isolation, but to accompany an utterance – convey attitudinal information comparable, or even very similar, to the kind attributed to certain linguistic items analysed as procedural expressions and seem to also do so by guiding inferential operations. Thus, in his study on the pragmatics of non-verbal communication, Wharton considers that the wide variety of linguistic items that have been described in procedural terms might suggest the possibility that procedural meaning is a sub-category of meaning pertaining to a broader class of communicative devices, one which also includes paralinguistic behaviours, and which he labels as 'non-translational', all sharing both a lack of semantic content that is 'translatable' into conceptual constituents of the proposition and the function of guiding inferential processes of utterance interpretation.

Problems and Perspectives: Overview of the Chapters

The contributions in this volume aim to enter the current debate around procedural meaning by offering new arguments, new data and new insights into the status of instructional encoding within linguistic theory. The nature and defining properties of procedural meaning are dealt with in detail and some of the controversial issues, such as the relationship between conceptual and procedural features, are directly addressed. A number of case studies provide empirical support and show the explanatory power of the notion.

The Nature of Procedural Meaning

Several chapters address theoretical questions about procedural meaning and its nature, limits and status within linguistic theory. The volume opens with the chapter by **Deirdre Wilson**, ''The Conceptual-Procedural Distinction: Past, Present and Future''. After presenting the rationale behind the conceptual-procedural distinction, Wilson discusses some of its cognitive commitments in terms of the processing mechanisms involved and the consequences for language acquisition. In her view, both conceptual and procedural expressions fall on the semantic side of the semantics/pragmatics divide, since the link between words and the concept or the instructions they convey is an arbitrary one, and hence a matter of linguistic knowledge. Concepts and procedures themselves, however, exist beyond the language system: whilst conceptual expressions are linked to concepts, which are constituents of the language of thought, procedural expressions, Wilson suggests, ''are systematically linked to *states of language users*'' (her emphasis). More specifically, in an approach to cognitive systems as an array of domain-specific mechanisms, procedural expressions are seen as explicitly activating some of these domain-specific procedures. Procedures are part of a 'machine language' at the sub-personal level, not constituents of the language of thought, which explains why they are neither accessible to consciousness, nor easily translatable in conceptual terms. After rejecting the claim, often attributed to relevance theorists, that encoding a procedure is incompatible with encoding a concept, Wilson explores the idea that all words ''carry some procedural content'': words encoding also a concept ''would carry the minimal instruction to construct an *ad hoc* concept which shares some encyclopaedic properties with the encoded concept''; words with procedural meaning only would encode more specific procedures. Adopting this view, she argues, would have some advantages. For instance, it makes it easier to understand how and why lexical meaning is inferentially modulated in the course of utterance

interpretation. Similarly, it can also explain how grammaticalisation works, namely as a process of gradual specification of the procedural side of a word, whereas its conceptual content becomes redundant. If procedures can belong to various cognitive systems, the prediction is that these should not be restricted to utterance interpretation, but involve mind reading, emotion reading and social cognition as well. Many expressions and clusters of features can, in fact, be accounted for as triggering procedures belonging to these sub-systems: this is the case of interjections related to emotions and mood indicators linked to the attribution of mental states. Procedural items can contribute to the two tasks involved in utterance interpretation: identifying the speaker's meaning (understanding) and deciding whether to believe it. Previous analyses of procedural meaning have focused on the first task only; Wilson argues that procedural encoding can also feed the mechanism of 'epistemic vigilance' (Sperber et al., 2010), involved in the task of deciding whether to believe the information communicated. The reliability of information can depend either on its source or on its content. Markers of evidentiality are procedural instructions bearing on the source, whereas discourse connectives, previously considered as guiding the hearer towards the speaker's intended meaning, can now be reanalysed as providing arguments to persuade the hearer. This view has interesting consequences on understanding first language acquisition and on refining the theoretical status of procedural meaning.

The chapter by **Carmen Curcó**, ''On the Status of Procedural Meaning in Natural Language'', discusses in detail the general question of whether procedural instructions are semantic or pragmatic. Whereas linguistic constraints on inference have been considered semantic in Relevance Theory from the very beginning (cf. Blakemore, 1987), some scholars have questioned this view and claimed that procedures are not semantic, but rather they express causal dispositions, and hence are pragmatic in nature (Bezuidenhout, 2004). Curcó argues against this stance and shows that most procedural elements are indeed best analysed as contributing a kind of semantic meaning; only a small part, she concedes, ought to be treated as dispositional. One major point in the argument has to do with the way in which procedural meaning is represented within natural language. If conceived of as encoding instructions to process representations, these instructions should be cast in representational terms; but then, if this were so, manipulating them would require new instructions, which, according to Bezuidenhout, would result in an infinite regress of rules. To avoid this unwelcome result, Curcó states that the representations contained in the entry of a procedure are 'bracketed', in a way that makes access to their content

unavailable at the personal level, whilst permitting that the encoded rule be executed at a sub-personal level. This also explains why procedural meanings are not easily accessible to consciousness. Thus, procedures show a number of properties: unlike causal dispositions, they are context-insensitive, categorical, arbitrary and language specific; they also represent a very specialised kind of semantic knowledge, namely how to operate on certain conceptual representations. Causal dispositions can have a place within cognitive systems; they occur as the tendency to adjust concepts or to find optimally relevant interpretations. Much can be gained, Curcó concludes, from a representational view of procedural meaning that can maintain its separation from pragmatic dispositions.

The issue of whether the conceptual/procedural distinction is a neat one has been a matter of debate along the last years. Can conceptual and procedural information both be present in the same expression – or rather, do they necessarily exclude each other? This is the question addressed by **Louis de Saussure** in his chapter ''On Some Methodological Issues in the Conceptual/Procedural Distinction''. He argues that the distinction should be maintained and puts forward a criterion to tell apart the representational from the instructional. His characterisation of procedural meaning is first cast in negative terms: when all meanings of an expression across contexts can be explained by resorting to a core concept and ordinary pragmatic processes operating on it (enrichment, narrowing and loosening), the expression should encode conceptual meaning; otherwise, it will be procedural. From this view, a positive characterisation can also be obtained: ''an expression is procedural when it triggers inferences that cannot be predicted on the basis of an identifiable conceptual core to which general pragmatic inferential principles are applied''; in other words, lacking a conceptual core, procedural expressions encode inferential schemata only. He then advocates for a clear-cut distinction, which does not necessarily map onto the general lexical/grammatical divide with respect to lexical items. The existence of expressions apparently carrying both conceptual and procedural meaning, such as personal pronouns, does not represent a counterexample to this generalisation: pronouns encode procedures involving concepts, and not concepts alone. As Saussure puts it, the procedural information ''*takes the conceptual information as a parameter*, as with *she*, and therefore *the conceptual information is simply under the dependence of the procedure*'' (his emphasis). Some conceptual information can thus be part of the information encoded in a procedure, but these two kinds of meaning are not at the same level and the conceptual information is always hierarchically dependent. Grammaticalisation processes can be easily accommodated in this framework

as well if one considers that the original conceptual representation has become opaque over time. French connectives *puisque*, *parce que* and *ensuite*, verbal tenses and modal auxiliaries are analysed to support these proposals. The chapter thus shows a way to account for the 'mixed' nature of certain expressions, whilst withholding all the advantages of maintaining a neat distinction between conceptual and procedural meaning.

The chapter by **Victoria Escandell-Vidal and Manuel Leonett**i, ''On the Rigidity of Procedural Meaning'', also argues in favour of a neat distinction between conceptual and procedural meaning as a central tool in linguistic theory. They conceive procedural meaning as encoding computational instructions relevant to the interpretive systems and propose 'rigidity' as the major feature of procedurally encoded information. Whereas concepts are flexible and can be modulated in various ways, instructions are rigid: ''The instructions encoded by an item must be satisfied at any cost for interpretation to succeed.'' The immediate prediction is that no inferential process can modify an encoded instruction. To test this hypothesis, Escandell-Vidal and Leonetti explore various kinds of mismatches (i.e. conflicts between the meanings of two linguistic expressions, or between the meaning of a linguistic item and the context where it is inserted). If a mismatch involving a procedural expression occurs, it should always be solved obeying the constraints imposed by the procedural item. When the mismatch occurs between a procedural expression and the context (i.e. when the assumptions accessible in the context cannot satisfy the conditions imposed by a procedural expression), the conflict is solved by inferentially adding (i.e. *accommodating*) new *ad hoc* assumptions: this is the case of mismatches involving definite determiners, verbal tenses and discourse connectives. Mismatches between lexical and grammatical aspect represent a further instance of a conflict between two encoded meanings – one conceptual, the other procedural. In this case, the conflict is solved by adjusting, or *coercing*, the lexical aspect of the predicate to comply with the requirements encoded by the procedural category, the result being that grammatical aspect always prevails over lexical aspect. Though infrequent, apparent clashes between two procedural expressions can also occur in some circumstances. Since the instructions encoded must both be satisfied, the only possibility left for the interpretation consists in adding further levels of conceptual assumptions so that each procedural item can take scope over a different event. The generalisation is thus that mismatch resolution triggers an interpretive, pragmatic process that adjusts conceptual representations to comply with the requirements encoded in procedural expressions,

never the other way round. Escandell-Vidal and Leonetti conclude that ''the occurrence of the mismatch, its interpretive effects and the direction of resolution are systematic and predictable'', which supports the rigidity of procedural meaning.

The relationship between procedural encoding and pragmatic inference is the main topic of the contribution by **Christoph Unger**, ''Exploring the Borderline between Procedural Encoding and Pragmatic Inference''. Starting from the assumption that the conceptual/procedural distinction is a basic one for an ostensive-inferential model of human communication, Unger puts forward a new dimension of the code-inference relation: that of non-linguistically-encoded linguistic indications, that is, the use of linguistic expressions to achieve effects on interpretation distinct from the meaning they encode. To account for these, the chapter resorts to Vega Moreno's (2007) notion of 'pragmatic routines'. The idea is that they convey indications that make a certain interpretive hypothesis more accessible, and hence the first to be tested, due to the existence of frequently repeated pragmatic inferences, thus contributing to efficiency in communication. Pragmatic routines can typically account for the conventionalisation of metaphorical senses. Among non-linguistically-encoded linguistic indications, Unger analyses cases of what he calls 'redundant' and 'tangential procedural marking'. A use is 'redundant' when the inference path required to interpret an utterance is so obvious that a special mark to this effect is not necessary, but nevertheless used. Tense, aspect, mood and evidentiality markers, being obligatory in many languages, provide central cases of redundant procedural marking in the indication of discourse prominence (fore- or backgrounding events). The occurrence of an unexpected marker can also trigger the reorganisation of discourse relations in a whole narrative passage or induce the recognition of a particular narrative genre. Speakers can thus exploit the use of linguistic indicators ''for purposes other than conveying their encoded meaning (semantic value)''. Tangential uses of procedural expressions can be found when nominal case selection (accusative vs. partitive) has a bearing on the temporal interpretation of the sentence, as in Estonian. Similarly, the use of demonstratives to trigger non-uniqueness implicatures, as treated by Scott (this volume, Ch. 8), represents another case in point. Procedural markers and pragmatic routines are thus conventional ways of enhancing efficiency in communication. Pragmatic routines ''make sure the right interpretive hypotheses are accessed first'', whereas procedural indicators ''improve the sub-procedures that compute cognitive effects.'' This perspective can shed new light on grammaticalisation phenomena and language change and

also makes an important contribution to the delimitation of inferential processes in human communication.

Reference

Four chapters in the volume analyse the role of procedural information in reference. Recently, work on determiners and pronouns as procedural expressions has established fruitful connections with both the philosophical tradition on definite descriptions and new developments in research on discourse anaphora.

Thorstein Fretheim deals with the way descriptive meaning in referring expressions contributes to truth-conditional content. In ''Description and Indication: The Use of Conceptual Meaning for a Procedural Purpose'', he relies on an assumption from the direct reference approach: namely, the idea that with referentially used expressions, it is the referent, and not the referring expression, that is a constituent of the proposition expressed. On these grounds, he claims that, at least in certain cases, descriptive meaning has the same function as procedural elements, which is to constrain the hearer's search for the referent to entities that satisfy the description. When definite descriptions are used referentially, descriptive meaning does not contribute a semantic constituent to the proposition: it simply guides the hearer towards reference resolution, thus having the same procedural role that a pronoun has. Conceptual elements, then, may count as procedural cues. To illustrate his proposal, Fretheim provides data from three types of referring expressions where descriptive meaning behaves like a procedural element: anaphoric, metacommunicative descriptions (*the other problem alluded to previously*), misdescriptions (like *the American composer Alexander Scriabin* and the metaphorical *the American Alexander Scriabin*) and descriptions that direct the hearer's attention to a percept (like *What you can see from here*, when the free relative has the procedural role of a demonstrative plus an appropriate gesture, in a context where the speaker refers to something particular that the hearer can perceive). This has interesting consequences for the relevance-theoretic notion of Logical Form, since it entails that some parts of the propositional schema in LF may disappear in the explicature of the utterance. In any case, the author provides support for the basic intuition behind the idea of procedural meaning in Relevance Theory, namely that meaning is in some cases not representational but instructional, when it constrains processes of pragmatic inference, and he does so by showing that this can be the case even with purely conceptual expressions like nominal constituents.

The contribution by **Christopher Lucas**, ''Definiteness, Procedural Encoding and the Limits of Accommodation'', presents a vigorous defence of Hawkins' (1978) well-known approach to definiteness, and argues for a reformulation of his original proposal in relevance-theoretic terms, with definiteness viewed as a case of procedural encoding. Lucas first gives an overview of different theories of definiteness and then shows how a procedural version of Hawkins' hypothesis is able to deal with all major usage types of definite NPs (anaphoric uses, immediate and larger situation uses, associative anaphoric uses, ''unfamiliar'' uses and ''unexplanatory modifier'' uses). One of the basic tools in Hawkins' theory is the notion of *P-set*, and Lucas gives a slightly revised definition of it: a P-set is a subset of the set of entities and assumptions that is mutually manifest to speaker and hearer. The uniqueness requirement on the referent, which is the essence of definiteness, must be satisfied in some P-set, and access to the intended P-set by the addressee is guaranteed by the principle of Relevance. Once the advantages of this basically pragmatic approach have been exposed, Lucas devotes the final section of his article to accommodation phenomena. His central claim is that a procedural approach to definiteness is able to explain the conditions under which accommodation processes work when a presupposition failure arises (for instance, when an addressee interprets the definite NP *my girlfriend* without even knowing that the speaker had a girlfriend). Presupposition failure is apparently a counterexample to a theory of definiteness like Hawkins', given that the P-set in which the referent has to be unique is not manifest to the addressee; and yet the use of the definite article is not ruled out. There is a misrepresentation of the mutual cognitive environment of the interlocutors, but the addressee is quite often able to solve it by simply adjusting the mutual cognitive environment and adding certain assumptions to the set of mutually manifest data. Accommodation is a gradient and context-dependent phenomenon: in some cases it occurs straightforwardly and the utterance is judged felicitous, in spite of presupposition failure, but in other cases it is next to impossible. As Lucas argues, instead of being a counterexample for the procedural theory of definiteness, this can only be explained in terms of such theory.

In ''Beyond Reference: Concepts, Procedures and Referring Expressions'', **Kate Scott** outlines a relevance-based account of referring expressions. In her view, both the conceptual and the procedural information encoded in such expressions may contribute to what is explicitly communicated (explicatures) and also to what is implicitly communicated (implicatures). Scott claims that referring expressions may guide the hearer not only towards the intended referents, but also

towards an intended global interpretation. Contrary to what is usually assumed, both conceptual and procedural information in referring expressions can make a contribution to the inferential phase of comprehension, by making certain contextual assumptions accessible. As for procedural items, the crucial data come from demonstratives. According to Scott, the procedural information about spatial relations encoded by demonstratives is exploited in the recovery of implicatures: it is relevant when the intended referent contrasts with other potential referents in a different spatial relation with respect to the speaker, and it gives rise to a range of weak implicatures about such excluded referents. In fact, certain contrasts in acceptability between definite articles and demonstratives depend on the inferences that the various forms encourage the hearer to draw via the procedural meaning they encode. So the contrast between *A restudy of pareiasaurs reveals that these primitive reptiles are the nearest relatives of turtles* and ?*A restudy of pareiasaurs reveals that the primitive reptiles are the nearest relatives of turtles* (from Gundel and Mulkern, 1998) is explained as an effect of the contribution of referring expressions to implicit content: the complex demonstrative *these primitive reptiles* gives rise to certain implicatures that cannot be accessed by means of the definite description *the primitive reptiles*, which is only marginally given a generic interpretation by some speakers (in competition with the generic reading available for the bare plural *primitive reptiles*). This leads Scott to argue that relevance theory, supplemented by an adequate view of the semantics of determiners and pronouns, is able to account for the use of referring expressions without relying on a RT-external implicational scale based on cognitive statuses of referents, like the Givenness Hierarchy.

Jeanette K. Gundel, in ''Child Language, Theory of Mind, and the Role of Procedural Markers in Identifying Referents of Nominal Expressions'', deals with the acquisition and use of referring expressions by English-speaking children, and claims that children's ability to use definite determiners and pronouns appropriately by age 3 is explained as a consequence of the procedural nature of such grammatical elements. Definite determiners and pronouns are generally considered as procedural items both in Relevance Theory and in Gundel's own theoretical framework, the well-known Givenness Hierarchy (cf. Gundel et al., 1993, and Gundel 2010 for a recent overview). The author assumes that determiners encode information about the cognitive status of intended referents and interpretations, thus instructing the hearer about how to access a mental representation of the referent. After a presentation of the Givenness Hierarchy, with the unidirectional entailment relations holding between the cognitive statuses included in it and the scalar

implicatures that may arise from such entailments, Gundel shows that at age 3 or earlier children not only know the linguistic meaning of pronouns and determiners, but they are able to assess an interlocutor's mental state in relation to possible referents, with very few errors. This means that they have already acquired some kind of 'theory of mind', that is the ability to impute mental states to others, which allows speakers to decide whether a particular form in the Givenness Hierarchy can be appropriately used to guide a hearer towards the intended referent. However, at such an early age children are normally unable to pass certain standard theory of mind tests. In order to find an explanation for such *prima facie* contradictory facts, Gundel exploits two reasonable assumptions: the first one is that procedural information is non-representational and inaccessible to consciousness (Wilson and Sperber, 1993), and the second one is that the acquisition of mind-reading abilities proceeds through different stages. As the knowledge of procedural meaning is implicit, its acquisition does not require the kind of explicit, conscious reflection on the amount of information available to hearers that is needed for a child to deal with standard theory of mind tasks. Determiners and pronouns are thus appropriately used by children at an early stage, before they are able to reason consciously about the epistemic state of others and assess how much information about cognitive status is sufficient and relevant for the addressee. An interesting correlation emerges between the nature of procedural meaning in determiners and pronouns and the development of linguistic and metarepresentational abilities in language acquisition.

Tense and Modality

As mentioned above, mood and tense have become key areas into which procedural analyses have extended and provided very useful frameworks for more adequate explanations of a variety of related phenomena.

In relation to these areas, two studies representing diverging conclusions follow in the volume, the first being the chapter entitled ''Cross-linguistic Variation in Procedural Expressions: Semantics and Pragmatics''. In this study **José Amenós-Pons** presents the contrasts and similarities between the uses of the simple past (SP) and the compound past (CP) tenses in Spanish and French. The benefits of considering tense as procedural are brought to light by way of careful analysis based on corpora from each of these two languages. The author provides data from a variety of text types and leads the reader from a clear explanation of the uses of each tense in the two languages considered, to a series of well-justified conclusions in which the procedural nature of the

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tenses is seen to have a common core. The question that is brought up as a consequence is that of where to situate the features that create the contrast between the uses of these tenses in French and Spanish. Amenós-Pons offers a discussion of the role of the grammatical elements that form part of the two tenses, for example the auxiliaries *haber* (Spanish) vs. *etre* and *avoir* (French), relating the diachronic factors that determined the loss of one auxiliary in Spanish to an asymmetry consisting in a decrease in the range of uses of the Spanish CP as compared to this tense in French. He not only provides procedural descriptions of the semantics of the two tenses under consideration, but also a discussion of the distinctions between the meaning and the conventions of use of each tense, offering insight into how both pragmatic specialisation and structural change can lead to the cross-linguistic variation observed in expressions with the same procedural semantics across languages. This discussion also suggests some significant issues for further work on cross-linguistic variation in procedural expressions, for instance, the question of how such variation affects second language acquisition processes. Amenós-Pons convincingly argues in favour of adopting a view of tense as procedural for the purpose of developing descriptions of this grammatical category that can have cross-linguistic scope and validity.

The development that procedural approaches have brought about in the study of mood is exemplified in the chapter written by **Mark Jary**. In ''Assertion, Relevance and the Declarative Mood'', this author puts forth an analysis of sentence mood that takes the role of the declarative in utterance interpretation to be that of an element affecting the likelihood of the sentence to be used as a premise to derive contextual effects. In this study we are presented with a grammatical element which is not conceptual, yet Jary suggests it may represent a type of meaning that does not fit into the category of procedural semantics either, which contrasts his proposal with previous relevance-theoretical stances regarding mood. He formulates an analysis of the declarative mood that distinguishes it from assertion – which, as he notes, is a complex social, cognitive and linguistic phenomenon – focusing on a plausible semantics for this mood itself, and at the same time offering an explanation of why it is associated with both assertion and main point status in discourse. Specifically, this analysis shows the declarative as unique in having the function of indicating that the proposition is relevant in its own right in a context. This function differs from the author's view of assertion, stemming from a philosophical perspective, in which to assert is, necessarily, to subject a proposition to the hearer's possible questioning or refutation. Building upon this view, one of Jary's main aims in this chapter

consists in distinguishing assertoric force from the declarative mood, the former only occurring when a declarative sentence is interpreted within a factual context. Jary's chapter offers a range of insights that contribute to strengthening and further developing some of the original claims of relevance theorists regarding mood and its relation to speech acts and information structure.

Discourse Markers

The next two chapters present studies that fully focus on one of the core issues in relation to which procedural meaning was originally conceived of: that of discourse markers.

In **Susana Olmos**, **Laura Innocenti and John Saeed's** study, ''The Procedure of Marking Contrast with Alternatives: a Constraint in the Derivation of Higher Level Explicatures'', the authors begin by discussing previous relevance-theoretical analyses of *but*, and contribute data from Spanish and Italian to support a new hypothesis for a procedural account of several related discourse markers across the two languages, all associated with the function of showing contrasts among propositions or assumptions. A variety of data from the uses of Spanish *pero* are shown that seem scarcely amenable to explanation based on previous RT accounts, which analysed *but* as an expression leading to the denial and suspension of an assumption. The authors' formulation of the procedure encoded by *pero* as an instruction to establish a contrast among assumptions enable them to provide a new description of how it leads to the interpretations observed. The proposal consists in describing the effect of marking contrast as affecting the higher-level explicatures of the utterance, in particular the representation of the speaker's propositional attitude. In addition, the authors situate the semantics proposed for *pero* within the context of a set of both Spanish and Italian discourse markers: Spanish *aunque* ('although'), and Italian *ancora* and *già*, the latter being both aspectual adverbs and, on this account, contrast marking devices. Thus, this proposal offers the important advantage of bringing together several discourse markers in a cross-linguistic view of procedural expressions of contrast. The findings presented in this chapter offer new perspectives for the study of procedural expressions across related languages, which could lead to developing applications of procedural accounts of discourse markers in language teaching and translation, among other fields.

In her study ''A Procedural Analysis of *kadhalik* in Modern Standard Arabic: Demonstrative or Discourse Marker?'', **Mai Zaki** analyses an Arabic demonstrative which, when combined with a prefix,

can take on the role of a discourse marker. She thus offers a further contribution to this area of procedural meaning, inter-related with the original insights into the functions of discourse markers that led Blakemore to establish the conceptual-procedural distinction. The characteristics of Arabic lead to this author's differentiation of the morphological elements that are brought together to make up the procedural expression *kadhalik*, which consists of a prefix related to similarity and a demonstrative pronoun. Interestingly, the same combination is also used with a demonstrative function, and Zaki distinguishes the demonstrative and the discourse marker through the application of her procedural analysis. She proposes that, when the prefix contributes to the truth-conditions of the utterance, the import is that of a demonstrative, whereas when it is semantically and syntactically optional, this expression plays the role of a discourse marker. The discourse marker use of *kadhalik* indicates that "the two segments of the utterance are to be considered as premises for the same conclusion", thus having a function very similar to that of English *also*. An explanation of how this function developed and the conditions under which it is assigned to the expression studied is also provided. In sum, this chapter offers the contribution of providing data from a less-studied language within the literature on procedural meaning, discussing a distinction in the uses of a single expression that can convey meaning either as a demonstrative or as a discourse marker.

Intonation

The role of prosody in utterance interpretation is uncontroversial: differences in pitch, length, loudness and voice quality can have a significant role in utterance interpretation. The contribution of prosody is partly natural and iconic, and partly conventional and arbitrary. The null hypothesis is, therefore, that the linguistic side of prosody can be accounted for in terms of procedural encoding.

The chapter by **Daniel Sax**, "Sentence Stress and the Procedures of Comprehension", concentrates on the role of stress in the incremental processing at the sentence level. Its contribution, though determining utterance interpretation, does not necessarily represent an instance of procedural meaning, at least with respect to stress positions. To build his argument, Sax relies on Wedgwood's (2005) dynamic approach and presents a model of how anticipatory hypotheses are put forward in the course of on-line parsing and interpretation. In his model, "sentence stress draws the hearer's attention to a particular *stage* of processing as being particularly worthy of an investment of processing effort, holding

forth the promise of rich cognitive effects to be derived at that stage.''
(his emphasis). This approach contrasts with other common proposals –
one of which being Wilson and Sperber's (1979) – that treat sentence
stress in terms of focal scales indicating where to find the relevant
entailments. Whereas both approaches give similar results in the
analysis of final stress, Sax argues that his model has advantages when
dealing with instances of non-final (i.e. anticipated) stress: the hearer is
encouraged to spend interpretive effort at an early stage and treat as
correct any of his anticipatory hypothesis, which the final stages of
processing will confirm. The proposal also accounts for the different
degrees of predictability of the post-focal constituents and for the effects
due to misplacements of sentence stress, which will result in an
unrewarded extra processing effort. From his analysis, Sax concludes
that the tone contour is indeed an encoded procedural instruction that
guides the hearer towards the intended interpretation, but its placement
over one particular constituent is not. This has interesting consequences
for the way in which we conceive of the role of prosody within a theory of
human communication.

Whereas Sax's chapter mainly deals with intonation at a
sentential level, the chapter by **Leopoldo O. Labastía**, ''Procedural
Encoding and Tone Choice in Buenos Aires Spanish'' examines the
contribution of intonation to a more global level. Using data from
spontaneous speech, the author analyses how intonational features are
exploited to organise information by overtly providing specific
procedural instructions that guide the hearer towards the intended
interpretation, thus reducing the overall processing effort. When
conceived of in this way, intonation has a discourse-building function,
indicating structural relations such as dependence, continuity and
discontinuity. Labastía combines the theoretical insights of Relevance
Theory with the Autosegmental-Metrical framework of intonational
phonology (Pierrehumbert, 1980 and subsequent work). This is a model
that takes into account pitch accents, phrase tones and boundary tones
and analyses them in terms of three minimal, stylised pitch accents
(High, Medium and Low), whose alignment and combinations can
describe any intonational pattern. The presentation is easy to follow,
even for a reader that may be unfamiliar with prosodic notation
conventions. After carrying a detailed transcription and analysis of
three radio interviews, the author draws some general conclusions: for
example, low boundary tones are systematically associated with
assertions and indicate that the utterance will satisfy the expectations
of relevance; mid tones, in contrast, invariably indicate that the
hearer's expectations of relevance might not be fully satisfied until a

low boundary tone is reached; other combinations indicate different constraints on discourse-structure building. As Labastía shows, an account of intonation in procedural terms can thus make significant contributions both to a cognitive theory of utterance interpretation and to a theory of discourse organisation.

<div align="right">
Victoria Escandell-Vidal
Manuel Leonetti
Aoife Ahern
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